

CLAIMS:

1. An image forming apparatus, comprising:

an image reading device configured to read an image of an original document;

an image forming device configured to form an image on a sheet in accordance with image data read by the image reading device;

an operation unit connecting device configured to detachably connect an operation unit, said operation unit being configured to accept inputting of operational instructions operating the image forming apparatus;

a process controller configured to control an operation of the image forming apparatus; and

an expansion unit connecting device configured to connect an additionally attachable expansion unit, said expansion unit connecting device including an expansion control device configured to allocate the image reading device or the image forming device to a job,

wherein said process controller controls the operation unit to operate and receives a control command from the expansion control device to perform image formation.

2. The image forming apparatus according to claim 1, wherein said process controller includes,

a memory configured to store at least two control programs for controlling the image forming apparatus,

an extension unit detecting device configured to detect a presence of connection of the additionally attached expansion unit, and

a control program selecting device configured to select an applicable control program to be used by the process controller in accordance with the detection result of the extension unit detecting device.

3. The image forming apparatus according to claim 1, further comprising:

an extension unit detecting device configured to detect a presence of connection of the additionally attached expansion unit; and

a power saving mode setting device configured to set a power saving mode to the image forming apparatus,

wherein said power saving mode setting device determines sections of the image forming apparatus to operate under the power saving mode in accordance with the detection result of the extension unit detecting device.

4. The image forming apparatus according to claim 2, wherein said extension unit detecting device detects the presence of connection of the additionally attached expansion unit by determining if any unit is connected to the expansion unit connecting device.

5. The image forming apparatus according to claim 3, wherein said extension unit detecting device detects the presence of connection of the additionally attached expansion unit by determining if any unit is connected to the expansion unit connecting device.

6. The image forming apparatus according to claim 2, wherein said extension unit detecting device detects the presence of the connection of the additionally attached expansion unit by determining that the additionally attached expansion unit is connected when the operation unit is not connected to the operation unit connecting device, and by determining that the additionally attached expansion unit is not connected when the operation unit is connected to the operation unit connecting device.

7. The image forming apparatus according to claim 3, wherein said extension unit detecting device detects the presence of the connection of the additionally attached expansion unit by determining that the additionally attached expansion unit is connected when the operation unit is not connected to the operation unit connecting device, and by determining that the additionally attached expansion unit is not connected when the operation unit is connected to the operation unit connecting device.

8. The image forming apparatus according to claim 1, wherein the expansion unit connecting device includes a data transferring device configured to communicate image data and control commands with the additionally attached expansion unit, and a bus selecting device configured to select a data transfer destination in accordance with a type of the data received by the data transferring device.

9. The image forming apparatus according to claim 1, wherein the image reading device includes a contact image sensor, and said image forming apparatus includes a color identification data adding device configured to add color identification data to image data read by the contact image sensor, said color identification data indicating a location and color component.

10. The image forming apparatus according to claim 8, further comprising:
a read image data processing device configured to apply image processing to image data read by the image reading device;
a write image data processing device configured to convert the image data into a signal driving the image forming apparatus and configured to apply image processing to the signal required along with the converting process; and
a supervising device configured to supervise data input and output to and from the process controller,
wherein said expansion unit connecting device includes a bus configured to communicate data and a bus interface for the bus, and
wherein at least the read image processing device, the write image processing device, the supervising device, the bus interface and the bus selecting device are arranged on a same chip.

11. An image forming system, comprising:
an image forming apparatus including an image reading device configured to read an image of an original document, an image forming device configured to form an image on a sheet in accordance with image data read by the image reading device, an operation unit connecting device configured to detachably connect an operation unit, said operation unit being configured to accept inputting of operational instructions operating the image forming apparatus, a process controller configured to control an operation of the image forming apparatus; and
an expansion unit connecting device configured to connect an additionally attachable expansion unit, said expansion unit connecting device including an expansion control device configured to allocate the image reading device or the image forming device to a job,
wherein said process controller controls the operation unit to operate and receives a control command from the expansion control device to perform image formation.

12. The image forming system according to claim 11, wherein
said operation unit is connected to the expansion unit connecting device,
said expansion control device of the expansion unit connecting device includes a first control device configured to control an operation of the operation unit,

said process controller of the image forming apparatus includes a second control device configured to control an operation of the operation unit, and

said image forming system further includes an operation selecting device configured to select one of the first and second control devices.

13. The image forming system according to claim 12, wherein said operation selecting device selects one of the first and second devices in accordance with a processing load on the expansion control device.

14. The image forming system according to claim 12, wherein said additionally attached expansion unit is configured to engage with at least one function adding unit, said at least one function adding unit adding at least one function to the image forming system under control of the expansion control device, and said operation selecting device selects one of the first and second devices in accordance with a number of function adding units connected to the additionally attached expansion unit.

15. The image forming system according to claim 11, wherein said additionally attached expansion unit includes a first image memory configured to store image data,

said image forming apparatus includes an image memory connecting device configured to connect a second image memory configured to store image data, and

said additionally attached expansion unit includes a storage control device configured to recognize and store image data having a same format as that to be stored in the second image memory.

16. The image forming system according to claim 11, wherein said expansion control device controls the additionally attached expansion unit only when power is to be supplied to the expansion unit connecting device.

17. A method for controlling an image forming apparatus including an image reading device configured to read an image of an original document, an image forming device configured to form an image on a sheet in accordance with image data read by the image reading device, an operation unit connecting device configured to detachably connect an operation unit, said operation unit being configured to accept inputting of operational

instructions operating the image forming apparatus, a process controller configured to control an operation of the image forming apparatus, and an expansion unit connecting device configured to connect an additionally attachable expansion unit, said expansion unit connecting device including an expansion control device configured to allocate the image reading device or the image forming device to a job, and said method comprising:

- storing at least one control program in a memory, said at least one control program being used by the process controller to control an operation of the image forming apparatus;
- detecting a presence of connection of the additionally attached expansion unit;
- selecting a control program used by the process controller in accordance with a detection result; and
- controlling the image forming apparatus using the selected control program.

18. The method according to claim 17, further comprising:
setting a power saving mode to the image forming apparatus,
wherein the setting step determines sections of the image forming apparatus to operate under the power saving mode in accordance the detection result.

19. The method according to claim 17, wherein said detection step detects the presence of connection of the additionally attached expansion unit by determining if any unit is connected to the expansion unit connecting device.

20. The method according to claim 17, wherein said detection step detects the presence of the connection of the additionally attached expansion unit by determining that the additionally attached expansion unit is connected when the operation unit is not connected to the operation unit connecting device, and by determining that the additionally attached expansion unit is not connected when the operation unit is connected to the operation unit connecting device.

21. The method according to claim 17, wherein the expansion unit connecting device includes a data transferring device configured to communicate image data and control commands with the additionally attached expansion unit, and a bus selecting device configured to select a data transfer destination in accordance with a type of the data received by the data transferring device.

22. The method according to claim 17, wherein the image reading device includes a contact image sensor, and said image forming apparatus includes a color identification data adding device configured to add color identification data to image data read by the contact image sensor, said color identification data indicating a location and color component.

23. The method according to claim 21, further comprising:
applying image processing to image data read by the image reading device;
converting the image data into a signal driving the image forming apparatus and
applying image processing to the signal necessitated along with the converting process; and
supervising data input and output to and from the process controller,
wherein said expansion unit connecting device includes a bus configured to
communicate data and a bus interface for the bus, and
wherein at least the read image processing device, the write image processing device,
the supervising device, the bus interface and the bus selecting device are arranged on a same
chip.

24. A computer program product for controlling an image forming apparatus
including an image reading device configured to read an image of an original document, an
image forming device configured to form an image on a sheet in accordance with image data
read by the image reading device, an operation unit connecting device configured to
detachably connect an operation unit, said operation unit being configured to accept inputting
of operational instructions operating the image forming apparatus, a process controller
configured to control an operation of the image forming apparatus, and an expansion unit
connecting device configured to connect an additionally attachable expansion unit, said
expansion unit connecting device including an expansion control device configured to
allocate the image reading device or the image forming device to a job, and said computer
program product comprising:

a first computer code configured to store at least one control program in a memory,
said at least one control program being used by the process controller to control an operation
of the image forming apparatus;

a second computer code to detect a presence of connection of the additionally attached
expansion unit;

a third computer code configured to select a control program used by the process controller in accordance with a detection result; and

a fourth computer code to control the image forming apparatus using the selected control program.

25. The computer program product according to claim 24, further comprising:

a fifth computer code configured to set a power saving mode to the image forming apparatus,

wherein the fifth computer code determines sections of the image forming apparatus to operate under the power saving mode in accordance the detection result.

26. The computer program product according to claim 24, wherein said second computer code detects the presence of connection of the additionally attached expansion unit by determining if any unit is connected to the expansion unit connecting device.

27. The computer program product according to claim 24, wherein the second computer code detects the presence of the connection of the additionally attached expansion unit by determining that the additionally attached expansion unit is connected when the operation unit is not connected to the operation unit connecting device, and by determining that the additionally attached expansion unit is not connected when the operation unit is connected to the operation unit connecting device.

28. The computer program product according to claim 24, wherein the expansion unit connecting device includes a fifth computer code configured to communicate image data and control commands with the additionally attached expansion unit, and a sixth computer code configured to select a data transfer destination in accordance with a type of the data received by the data transferring device.

29. The computer program product according to claim 24, wherein the image reading device includes a contact image sensor, and said image forming apparatus includes a fifth computer code configured to add color identification data to image data read by the contact image sensor, said color identification data indicating a location and color component.